

IMPACT OF THE RECESSION ON U.S. EDP BUDGETS IN 1975 and 1976

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V COMPUTER EQUIPMENT EXPENDITURES - 1975

This section discusses end user planned expenditures in 1975 for computer equipment of all types. Emphasis is placed on changes made in prior plans arising from the economic restraints caused by the current recession, as well as those changes arising from new application requirements and vendor product announcements. Changing user attitudes toward vendors are also covered.

A. OVERVIEW

Users have substantially reduced plans for increased expenditures on computer equipment. As recently as the fourth quarter of 1974 several surveys of users in all industries, indicated equipment expenditures would grow in the same general range of 13-15% that has been the average (and IBM's growth plan) for the past ten years.

INPUT's survey now shows that user plans in the nine key industries surveyed, show computer equipment expenditures growing at an average of 6.9%, as shown in Table V-1, or about half the historical growth rate.

Among industry sectors a wide spread was reported in plans. The highest growth rate was reported among Federal agencies with an average of 10.2%. Generally, agency budgets have not been affected by the

EDP EQUIPMENT EXPENDITURES GROWTH BY INDUSTRY SECTOR

INDUSTRY SECTOR	EQUIPMENT		
	1974 \$ MILLION	1975 \$ MILLION	% GROWTH
INS. & DIV. FINANCIAL	488	533	9.2
BANKING	299	323	8.0
RETAIL	403	410	1.7
DISCRETE MNFG.	1,592	1,664	4.5
PROCESS MNFG.	1,298	1,397	7.6
TRANSPORTATION	312	318	1.9
UTILITIES	283	293	3.5
FEDERAL GOVT.	1,394	1,552	11.3
STATE & LOCAL GOVT.	210	223	6.2
TOTAL	6,279	6,713	6.9

TABLE V-1

recession. In the case of FEA and EPA, new programs required by legislation passed in the last Congress, have forced new multi-million-dollar EDP programs to be initiated.

The second highest growth rate was in insurance at 9.2%, where life carriers more than offset contracts in plans by property and casualty and other conglomerates.

On the bottom end of the scale, no industry reported an actual reduction in equipment expenditures in 1975 over 1974. However, the retail sector's plans were set to grow only 1.7%, due primarily to the recession. This low rate does not reflect point of sale expenditures. POS equipment expenditures are generally not reported as 'EDP expenditures', but rather as 'store fixtures' controlled by an entirely different management group.

Transportation companies were planning to increase equipment expenditures only by 1.9%. Airlines and major railroads both reported that lower profits had caused EDP plans to be stretched out. However, churning (e.g. trading one vendor's equipment for another's) was prevalent in the terminal and communications areas.

Among equipment categories, terminals and data communications equipment are the fastest growing. One of these two categories is the fastest growing in 7 out of the 9 industries surveyed, as shown in Table V-2. This reflects the continuing user development of distributed processing and remote computing applications - particularly those which tie together dispersed locations of major companies.

Confirming this point is that the fastest growing equipment category in the other 2 out of 9 industries, is secondary processors. Users

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

SUMMARY FOR REPORTED INDUSTRY/SIZE GROUPS

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	1,931	2,038	5.5
SECONDARY PROCESSORS	457	487	6.6
PERIPHERALS	1,772	1,877	5.9
TERMINALS	1,002	1,150	14.8
DATA COMM. EQUIPMENT	298	328	10.1
DATA ENTRY	819	833	1.7
TOTAL	6,279	6,713	6.9

(\$ MILLIONS)

TABLE V-2(a)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: INSURANCE & DIVERSIFIED FINANCIAL
(FOR LARGEST COMPANIES ONLY)

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	161	166	3.1
SECONDARY PROCESSORS	21	25	19.0
PERIPHERALS	150	165	10.0
TERMINALS	73	88	20.5
DATA COMM. EQUIPMENT	20	22	10.0
DATA ENTRY	63	67	6.3
TOTAL	488	533	9.2

(\$ MILLIONS)

TABLE V-2(b)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: BANKING
(FOR LARGEST COMPANIES ONLY)

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	87	90	3.4
SECONDARY PROCESSORS	9	10	11.0
PERIPHERALS	81	87	7.4
TERMINALS	64	74	15.6
DATA COMM. EQUIPMENT	17	20	17.6
DATA ENTRY	41	42	2.4
TOTAL	299	323	7.7

(\$ MILLIONS)

TABLE V-2(c)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: UTILITIES
(FOR LARGEST COMPANIES ONLY)

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	91	93	2.2
SECONDARY PROCESSORS	15	16	6.7
PERIPHERALS	84	87	3.6
TERMINALS	39	41	5.1
DATA COMM. EQUIPMENT	16	17	6.3
DATA ENTRY	38	39	2.6
TOTAL	283	293	3.5

(\$ MILLIONS)

TABLE V-2(h)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: FEDERAL GOVERNMENT
(FOR NON-SECURITY RELATED EXPENDITURES)

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	414	455	9.9
SECONDARY PROCESSORS	100	105	5.0
PERIPHERALS	406	452	11.3
TERMINALS	205	240	17.1
DATA COMM. EQUIPMENT	69	79	14.5
DATA ENTRY	200	206	3.0
TOTAL	1,394	1,537	10.3

(\$ MILLIONS)

TABLE V-2(i)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: RETAIL
(FOR LARGEST COMPANIES ONLY)

EQUIPMENT CATEGORY	1974 ACTUAL	197 FORECAST	% GROWTH
MAIN PROCESSORS	141	145	2.8
SECONDARY PROCESSORS	14	15	7.1
PERIPHERALS	131	131	0
TERMINALS	50	51	2.0
DATA COMM. EQUIPMENT	20	20	0
DATA ENTRY	47	48	2.1
TOTAL	403	410	1.7

(\$ MILLIONS)

TABLE V-2(d)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: DISCRETE MANUFACTURING
(FOR LARGEST COMPANIES ONLY)

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	491	511	4.1
SECONDARY PROCESSORS	114	114	0
PERIPHERALS	416	420	1.0
TERMINALS	265	305	15.1
DATA COMM. EQUIPMENT	76	84	10.5
DATA ENTRY	230	230	0
TOTAL	1,592	1,664	4.5

(\$ MILLIONS)

TABLE V-2(e)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: PROCESS MANUFACTURING
(FOR LARGEST COMPANIES ONLY)

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	405	433	6.9
SECONDARY PROCESSORS	115	131	14.0
PERIPHERALS	374	400	7.0
TERMINALS	202	242	19.8
DATA COMM. EQUIPMENT	58	62	6.9
DATA ENTRY	144	144	0
TOTAL	1,298	1,412	8.8

(\$ MILLIONS)

TABLE V-2(r)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: TRANSPORTATION
(FOR LARGEST COMPANIES ONLY)

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	85	85	0
SECONDARY PROCESSORS	43	44	2.3
PERIPHERALS	80	82	2.5
TERMINALS	61	63	3.3
DATA COMM. EQUIPMENT	12	13	8.3
DATA ENTRY	31	31	0
TOTAL	312	318	1.9

(\$ MILLIONS)

TABLE V-2(g)

COMPUTER EQUIPMENT EXPENDITURES ANALYSIS

INDUSTRY: STATE AND LOCAL GOVERNMENT
(FOR LARGEST ORGANIZATIONS ONLY)

EQUIPMENT CATEGORY	1974 ACTUAL	1975 FORECAST	% GROWTH
MAIN PROCESSORS	56	60	7.1
SECONDARY PROCESSORS	26	27	3.8
PERIPHERALS	50	53	6.0
TERMINALS	43	46	7.0
DATA COMM. EQUIPMENT	10	11	10.0
DATA ENTRY	25	26	4.0
TOTAL	210	223	6.2

(\$ MILLIONS)

TABLE V-2(j)

reported that increased expenditures on secondary processors were directed toward developing communications oriented satellite processors, often built around minicomputers or small general purpose computers such as IBM System 3.

Further confirming user emphasis on remote rather than host sites, was the fact that in no case did mainframe expenditure plans exceed a 1968 growth, while growths in terminals, data communications equipment, secondary processors, and direct access memory peripherals often exceed 1968 for several industries.

Thus INPUT concludes, that while computer equipment expenditures will grow at about half the historical and prior planned rate, the reduction comes mostly at the expense of central, host, computer sites, while remote processing plans have been maintained or reduced only slightly.

B. EQUIPMENT CATEGORY ANALYSIS

User plans for computer equipment expenditures are reviewed below for each major category.

1. Main Processors

This category covers the host computer, including processing unit/s, main memory, extended memory, and controllers for input/output peripherals and related devices. Data communications equipment and dedicated data entry equipment is not included, but counted in its own category.

Federal Government's plans for expanding major EDP applications are

apparently unaffected by the recession. Agencies will increase expenditures on main processors at 9.9% faster than any other sector. Not far behind, with a growth rate of 7.1% are large state and local governments.

- Slower growth in most industries.

On the other hand, expenditures for equipment for 6 of the other 7 industry sectors will grow at less than 4%.

States reported they were generally trying to centralize large computer systems physically while expanding user access through RJE terminals. Two states were even trying to absorb state university operated systems. (Education operated computers are not counted in the state and local government category).

Among other users aiming for distributed processing networks, a major eastern bank and a large aerospace firm said they were accelerating plans to centralize large computers. They were providing for expanded access to TDP through the use of RJE terminals rather than use of smaller computer systems on a stand-alone basis.

Other users, however, have held up and stretched out plans involving upgrading or acquiring large computers to implement distributed processing. In almost all industries users said that, in the past three months, they had delayed 370/155 to 370/158 or 370/165 to 370/168 upgrades, or postponed acquisition of similar large scale systems. Retailers, utilities and chemical manufacturers were particularly hard hit. One bank said, that while it had decided not to upgrade its 158 to a 168, it had leased additional mainframe memory.

o 'Take the blinders off'.

Most startling of all was the increasing involvement of company financial managers in forcing EDP departments to consider down-grading. 'Take the blinders off and look at the 360's again', was what the EDP department in one of the largest retail firms was told. And they did, replacing a 370/155 with a 360/65. The major impetus for this move is price. 360/65's can be leased for well under \$15K/month compared to \$30-40K or more for a 370/155. For the batch applications this computer is processing, the capabilities of the 360/65 hardware and software are perfectly adequate. These prices are possible only through third party leasing firms, and large users use these vendors almost without exception. Purchase of CPU's is often used as an alternative to leasing when users can borrow cash and use the tax benefits of ownership.

o Timesharing goes in-house.

For years users have said 'our outside expenditures for timesharing will be taken in-house because it's cheaper and the new operating systems enable us to do it'.

But the record shows users have not achieved their objective, and the timesharing use by large users has grown substantially.

This year users may achieve more than in the past, at least INPUT's survey indicated they are trying harder than ever. The major target is interactive timesharing, and several large users spending more than \$100K per month have ordered Cyber 74 and 76, IBM 370/168, and in some cases smaller systems for installation in 1975. More on this trend is presented under the discussion of Remote Computing Systems.

- To and away from IBM.

The trend to bringing timesharing in-house generally favors IBM. This is because users try to convert timesharing work done on vendor systems such as Xerox, Digital Equipment and Univac, on to their in-house computers which are IBM in over 65% of cases. This trend is made possible by standard IBM operating system software such as CMS and TSO.

However several large users reported a genuine trend away from IBM for specific general purpose applications. There are users, in banking, who chose a competitive vendor based on what appeared to be an objective analysis. There were no plans in these banks to convert existing IBM computers, but rather to cover new applications.

For additional mainframe memory, users mentioned several independent vendors as an alternative to IBM, including ITTEL, Electronic Memories and Cambridge Memories.

2. Secondary Processors

This category includes computers, mostly smaller general purpose systems and minicomputer based systems, used as satellite processors in RJE environments, or used as stand alone systems for business processing or utility purposes.

Growth plans in 1975 for secondary processors varies considerably by industry. Insurance firms, primarily life but also some property and casualty carriers, are implementing networks in branch offices which use small computers for local accounting, as well as for inquiry and data input to central, host computers. Expenditures by insurance carriers for secondary processors will gain 19% in 1975.

In some cases, minicomputers are being used for their ability to control peripherals as well as CRTs for data conversion. Olivetti and Nixdorf were mentioned by two large life carriers as the preferred small machines.

Process manufacturing growth of 14% in secondary processors, stems largely from the oil and mining companies, but spreads across most types of company in this sector. The difference from discrete manufacturing is that it is not necessary to tie the local computers into a network to report to a central computer for the majority of the work, since, when this happens, the local computer is often replaced by, or converted to, a remote batch or intelligent terminal. INPUT considers the applications for which minicomputers are used, to be more of a stand-alone nature in process than discrete manufacturing.

A key factor in minicomputer purchases by process manufacturing companies, is the degree of independence of local managers from corporate EDP restrictions. Thus a local vice president of a mine will have complete responsibility and autonomy in the use of computers at that mine. A similar situation exists with other process manufacturers such as oil companies and paper manufacturers, particularly where the plants are in remote locations. This last is also a major factor in the choice of manufacturer.

Because of the decentralization of procurement and other factors, information on the applications use of secondary processors in this industry sector is not easily available, and appears not to be that well known by the corporate EDP people. This situation with minicomputers is very close

to that of timesharing in the late 1960s and early 1970s, before serious attempts were made to consolidate and control the spread of its activity.

Of nine EDP interviews carried out in this sector, only one indicated no use of secondary computers. The others reported as follows:

Paper Company - Using 5 Industrial Nucleonics minis. for 'sophisticated' applications; increase in use expected.

Paper Company - Increase of 10% in expenditures for in-plant, stand-alone DEC and Nuclear Data minicomputers.

Mining Company - No known change, but use of minis. under control of local mine vice-president.

Chemical Company - Slight increase due to delayed installation of mini-computers for both warehouse and process control.

Oil Company - Had a few in 1974, adding several units from DEC and also IBM System 7s.

Food Company - Use spread out over several companies, 'some of which go their own way'. No new equipment known, but some increase in expenditures.

Beverage Company - Increase of 10% due to installation of 5 System 3 Mod. 15s over next 3 years.

Thus there is significant usage and potential growth in these companies in several different process manufacturing industries.

In banking, growth in secondary processors is being fueled by installation in major satellite centers, and also by a possible trend to decentralization. Two banks reported that they were decentralizing, one has

appeared to do it quietly and is now in the middle of conversion, the other has just started in the process of installing PDP 11s in profit centers.

If this is a trend, it will have a significant effect on the distribution of expenditures by banks for secondary and main processors. At the moment expenditures for secondary processors by these banks are only 10% of those for major processors; acceptance of the trend would indicate a potential growth rate of 50-100% in 1976 and 1977, since the base of \$10 million is relatively small, compared with the current rate of 11%.

These two banks and a third bank making a major investment in satellite computers, all indicated that these computers would be integrated into a network eventually, although they are on a stand-alone basis at first.

Retail stores are planning an expenditure growth of 7.1% for secondary processors. The explanation is two fold. First, small computers are needed in stores to control POS terminals and forward transaction data to central host computers. Second, large retail chains carry on extensive distribution and catalogue sales operations, which require separate secondary processor based network systems. These are key application areas, and while expenditures are stoved by the recession, the systems need to be installed and completed in order to maintain competitive position, profitability and customer service.

- No growth in discrete manufacturing.

Discrete manufacturing firms will spend no more in 1975 than 1974. The explanation lies not in a cut-back in expenditures, but in a steadying of growth after four or five years of rapid expansion in the use of secondary processors.

Large discrete manufacturing firms were among the first users to install satellite processors and convert existing remote, small, stand-alone computers, such as IBM 360/20, Univac 1050, and IBM 1130, to large batch or RJE terminals. Thus, much of the growth in this equipment category has already been achieved and new acquisitions are often replacements.

• Trend to non IBM systems.

Over 10% of users reported they had installed non IBM secondary processors to communicate with host IBM computers. These were most often minicomputer based turnkey systems which had been developed, integrated and installed by the minicomputer manufacturers themselves, or by independent systems houses, who had specialized experience in the application area which the systems were supporting.

3. Peripherals

This category includes all types of peripheral memory (disc, drums and tape) systems, and input/output devices (card-reader-punches, COM, and line printers), normally connected directly to main processors. Terminal and terminal components are not included.

While users have reduced their plans for main computer expenditures, they have shown more freedom in spending for peripherals, especially direct access memories, to enhance and expand the capabilities of central, main computer systems.

Federal government users will spend 11% more on peripherals this year, mostly to support large data base systems such as in FPC, EPA, FEA and HEW.

Life insurance firms will also expand peripheral expenditures to provide for storage of data flowing into host computers from remote terminals. The average for insurance industry will be 10% growth, with the life carriers slightly higher than property and casualty carriers.

• Slow growth in several industry sectors.

On the other side of the scale, the retail and discrete manufacturing sectors will have the lowest growth rates for peripheral expenditures. Both sectors will show growth at 1% or less. The primary reasons given by users is that major memory expansions have been made in prior years in anticipation of future storage requirements. In addition, the availability of double density and higher speed systems has permitted more capacity at roughly the same price.

• Independents sought out.

It was clear from the interview responses that users are seeking out independent suppliers to save money. These include Memorex, Telex, IteL and Storage Technology. Storage Technology in particular was mentioned more than any other independent across all industry sectors. This is chiefly because tape storage systems are now receiving as much attention as disc storage systems - often for the first time among vendors who have relied upon IBM for tape systems.

In the same way that corporate officers have told EDP management to 'take the blinders off' for 360 mainframes, they have told EDP personnel to review all peripheral systems acquisition. This trend, stimulated by the economy down-turn, permeates all industry sectors.

* Mass storage a hot button.

IBM's 3850 and other independent mass storage systems, are receiving lots of attention from large users who have extensive tape libraries. In fact, the 3850 is one of the few products cited by users as having a major attraction. Other products such as disc and tape systems have little new interest.

One large bank indicated that the 3850 could save 80% of input/output personnel in its current tape library operation. The bank was considering in addition to the 3850, Ampex, Grumman, and Control Data mass storage systems.

* Eliminating excess equipment.

Several users indicated they were searching through their installations to find under-utilized peripheral equipment. Such equipment was usually directed toward used equipment sale, or return to vendor where appropriate. Apparently, after 10-15 years some usable but underused equipment gets shoved in the 'back room'; now it is getting visibility.

* COM relieves the supplies problem.

The drastic increase in supplies costs, up to 100% for some respondents, has forced many users to install COM equipment. This usually occurs after using a COM service facility.

Some industries, such as insurance, are not receptive to microform, yet one of the largest life insurance companies was increasing its expenditures for equipment by 100%. Another had 12 COM units in already and was going to expand expenditures by at least 10%. Several of the largest

banks and retailers are also major users of COM.

The tendency of the user to stay with a service bureau indicates that some users regard COM as a transient piece of equipment, and therefore will buy a service rather than invest in a product. For most, however, it is a matter of economics; when the volume of service reaches a certain level the user acquires in-house COM hardware. The most commonly mentioned equipment in this regard was Datagraphix.

4. Terminals

Terminals include all devices (simple keyboards to complex, large, remote access systems) which are connected through communications facilities to host main processors. Terminals are usually located physically remote from the main processor and are thus distinguished from peripherals.

It is clear from almost all interviews that terminals are the equipment category least impacted by the recession and other spending constraints. The primary reason is the relatively fixed rate of expansion of remote computing systems in most large firms in major industries. Terminals are not a large expenditure item anyway (compared to mainframes), and the expense growth is left to continue. Another reason is that terminals are replacing stand-alone data entry devices in high transaction environments, such as order entry in insurance and manufacturing.

The fastest growth in terminal expenditures is forecasted in insurance, growing at 20.5%, and process manufacturing, growing at 19.8%. Banking, discrete manufacturing and the federal government also have terminal expenditure growth rates in excess of 15%.

• Slowest growth in retail.

Retail stores will have only a 2.0% growth in terminal expenditures. Remember, however, that point of sale terminals are counted as store fixtures expenditures, not EDP expenditures.

Transportation firms reported many installations of new terminals. However, the expenditure growth rate was only 3.3%, reflecting that most of the installations were not new, but rather replacement of existing terminals.

• Year of the terminal in insurance.

Unquestionably 1975 is the year of the new terminals in the insurance sector. Particularly life carriers, as yet unaffected by the recession, have prior terminal plans being implemented at a steady rate. In the healthier property and casualty carriers, there is also no interruption in plans. But in the harder hit carriers, terminal installation has been delayed or halted.

• Terminals tie operations together.

In almost all sectors terminal growth has been resistant to EDP cost cutting, because they are the catalyst for tying operations together. This is often a more critical corporate objective than reducing EDP expenditures.

Several users also reported plans to replace teletypewriter terminals with CRTs to improve the accuracy and work flow of data entry.

However, where terminal oriented projects were still in the development stage, there was a definite trend toward project stretchout.

- Most mentioned vendors.

Sanders, Incoterm, Anderson-Jacobsen, Texas Instruments and ADDS were among the vendors, other than IBM, most frequently mentioned by users for terminal acquisition. IBM and Sanders were also mentioned as candidates for competitive replacement.

5. Data Communications Equipment

Data communications equipment includes modems, multiplexors, concentrators, and front end preprocessors, but excludes channel controllers.

In concert with the high growth reported by users for terminal equipment expenditures, rapid data communications expenditure growth was also reported.

In banking, which is scheduled to spend 17.6% more on data communications equipment in 1975, the primary emphasis was on meeting the requirements of teller terminals installed in 1975, as well as anticipating requirements for 1976. In the federal government, growing at 14.5%, the expenditures were related to terminals being installed to access new data base systems in several agencies such as EPA, FPC and FEA.

- Only retail shows no growth.

Almost every sector will experience data communications expenditure growth near or above the average for all computer equipment. The only exception is retail, in which large stores have most of their data communications systems already in place and ready for expanded utilization. The lowest growth, except for retail, is in utilities which will spend 6.3% more on data communications equipment. This is primarily the effect of

utilities spending for devices to upgrade their in-place, right-of-way systems, to accommodate higher speed digital traffic.

- Users considering internally owned networks.

Several large users in banking, retail, and manufacturing sectors said they were beginning to consider the feasibility of their own nationwide, concentrator-based, switching networks for computer communications. INPUT staff is convinced that these statements represent very preliminary thinking, since the users were unaware of, or had given little consideration to, how packet systems, common carriers, or new Bell or Western Union offerings, might meet requirements as alternatives to in-house networks.

- Comten mentioned often.

Generally users did not mention data communications vendors very often. However, Comten was named at least five times as a viable supplier of front end communications preprocessors.

6. Data Entry

Data Entry equipment includes stand-alone devices (e.g. keypunches) or systems (e.g. Inforex key-to-disc) generally not connected online to host computers. Devices or systems usually connected to host computers are considered terminals, even if the primary function is data entry or collection (e.g. most point-of-sale systems).

The insurance sector has the highest growth rate for data entry equipment at 6.3%. State and local governments are next with 4.0%. Three sectors show no growth at all - discrete and process manufacturing and transportation.

a Data entry functions shift to terminals.

As might be expected, one explanation given by users for the relatively low growth of data entry equipment, is the shift of the data entry function to on-line terminals. Insurance, the two manufacturing and transportation sectors, are all current large users of terminals or growing terminal expenditures rapidly. Users in insurance, transportation and banking specifically cited the advantages of CRTs in providing data entry formatting and editing capability.

In addition the users reported several incidents of churning, e.g. replacing keypunch equipment with key-to-disc or diskette systems, to achieve faster throughput and higher accuracy with only a slight increase in expenditure.

a Not all expenditures counted.

Another factor identified by INPUT in explaining low data entry expenditure growth, is the dispersion of expenditures for data entry into operating departments. This is similar to the problems of accounting accurately for point-of-sale terminal equipment expenditures. Undoubtedly some data entry equipment is purchased by operating departments such as factory assembly, and thus does not show up in corporate EDP budgets.

VI COMPUTER SERVICES EXPENDITURES - 1975

In this section forecasts are provided for each of the main computer services market segments in 1975. It analyses the conflict situations between in-house data processing and outside computer services solutions to end users' EDP requirements. In particular, changes in the use of remote computing services and facilities management because of the recession, by companies of the size covered will be addressed.

Only those expenditures which are available in a competitive sense are counted. Transfers of funds within an organization are not counted as expenditures. Therefore 'spinoff' organizations, such as the subsidiaries of aerospace, petroleum and other manufacturing companies, are deemed to obtain their revenues solely from outside their parent organizations. Data processing expenditures by these organizations for their parent businesses are counted as in-house EDP expenditures.

A. OVERVIEW

Computer services expenditures in the areas covered are forecast by INPUT to grow, as shown in Table VI-1, in 1975 at a rate only of 10%, compared with recent years where the growth has been 20% or higher. This is primarily due to a slowdown in growth of the largest computer services

COMPUTER SERVICES EXPENDITURES GROWTH FOR 1975

(FOR DEFINED COVERAGE ONLY)

INDUSTRY SECTOR	1974 ACTUAL	1975 FORECAST	% GROWTH
INS. & DIV. FINANCIAL	171	195	14.0
BANKING	137	160	16.8
RETAIL	50	54	8.0
DISCRETE MNFG.	303	306	1.0
PROCESS MNFG.	235	263	11.9
TRANSPORTATION	67	77	14.9
UTILITIES	155	152	- 1.9
FEDERAL GOVT.	561	639	13.9
STATE & LOCAL GOVT.	52	59	13.5
TOTAL	1,731	1,905	10.1

(\$ MILLIONS)

TABLE VI-1

categories, remote computing and professional services, especially in the manufacturing and utilities industries.

- Dramatic growth rates are absent.

Growth rates in the fastest growing industry sectors (banking, transportation, and insurance and diversified financing) are also way below those that have been prevalent in the past. This reflects a general tightening-up of expenditures for development and secondary activities, even in those industries (banking and insurance) which have EDP expenditures growth in 1975 greater than other sectors, and which profess to be relatively unaffected by the recession.

- Recession and other problems causes growth in government sectors.

EDP activities in both federal and state and local government are being 'squeezed'. There are hiring restrictions and equipment expenditure restrictions in many agencies, but the need for EDP is increasing, especially in social services fields and those connected with energy and the environment. Consequently, these agencies are increasing their use of computer services since their internal growth cannot handle the demands. The overall growth rate is held back by cuts and restrictions in other agencies. Even so, three computer services categories have their fastest growths in these sectors, remote computing, software products, and batch services.

The importance of the size of the federal government as a user of computer services is demonstrated in Table VI-2, which shows that it will increase its share of these markets from 32% to 33.5% in 1975. Furthermore, discounting the federal government from the computer services expenditures

COMPUTER SERVICES EXPENDITURES ANALYSIS

SUMMARY FOR REPORTED INDUSTRY/SIZE GROUP

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	276	319	16
REMOTE COMPUTING SERVICES	569	651	14
PROFESSIONAL SERVICES	430	436	1
SOFTWARE PRODUCTS	209	242	16
BATCH SERVICES	185	197	6
EDUCATIONAL SERVICES	62	60	- 3
TOTAL	1731	1905	10

(\$ MILLIONS)

TABLE VI-2(a)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: INSURANCE & DIVERSIFIED FINANCIAL
(FOR LARGEST COMPANIES ONLY)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	27	30	11
REMOTE COMPUTING SERVICES	75	90	20
PROFESSIONAL SERVICES	22	20	- 9
SOFTWARE PRODUCTS	25	28	12
BATCH SERVICES	13	15	15
EDUCATIONAL SERVICES	9	12	25
TOTAL	171	195	14

(\$ MILLIONS)

TABLE VI-2(b)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: BANKING

(FOR LARGEST COMPANIES ONLY)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	26	35	35
REMOTE COMPUTING SERVICES	49	56	14
PROFESSIONAL SERVICES	17	20	18
SOFTWARE PRODUCTS	30	33	10
BATCH SERVICES	9	10	11
EDUCATIONAL SERVICES	6	6	0
TOTAL	137	160	17

(\$ MILLIONS)

TABLE VI-2(c)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: RETAIL

(FOR LARGEST COMPANIES ONLY)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	-	2	-
REMOTE COMPUTING SERVICES	29	32	10
PROFESSIONAL SERVICES	7	6	-14
SOFTWARE PRODUCTS	4	4	0
BATCH SERVICES	8	9	13
EDUCATIONAL SERVICES	2	1	-50
TOTAL	50	54	8

(\$ MILLIONS)

TABLE VI-2(d)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: DISCRETE MANUFACTURING
(FOR LARGEST COMPANIES ONLY)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	15	17	13
REMOTE COMPUTING SERVICES	92	95	3
PROFESSIONAL SERVICES	98	90	- 8
SOFTWARE PRODUCTS	45	50	11
BATCH SERVICES	38	42	11
EDUCATIONAL SERVICES	15	12	-20
TOTAL	303	306	1

(\$ MILLIONS)

TABLE VI-2(e)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: PROCESS MANUFACTURING
(FOR LARGEST COMPANIES ONLY)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	25	28	12
REMOTE COMPUTING SERVICES	114	136	19
PROFESSIONAL SERVICES	40	35	-13
SOFTWARE PRODUCTS	25	32	28
BATCH SERVICES	20	20	0
EDUCATIONAL SERVICES	11	12	9
TOTAL	235	263	12

(\$ MILLIONS)

TABLE VI-2(f)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: TRANSPORTATION

(FOR LARGEST COMPANIES ONLY)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	6	10	67
REMOTE COMPUTING SERVICES	26	30	15
PROFESSIONAL SERVICES	9	8	-11
SOFTWARE PRODUCTS	14	17	21
BATCH SERVICES	10	10	0
EDUCATIONAL SERVICES	2	2	0
TOTAL	67	77	15

(\$ MILLIONS)

TABLE VI-2(g)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: UTILITIES

(FOR LARGEST COMPANIES ONLY)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	5	5	0
REMOTE COMPUTING SERVICES	93	90	- 3
PROFESSIONAL SERVICES	17	15	-12
SOFTWARE PRODUCTS	28	30	7
BATCH SERVICES	8	8	0
EDUCATIONAL SERVICES	4	4	0
TOTAL	155	152	- 2

(\$ MILLIONS)

TABLE VI-2(h)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: FEDERAL GOVERNMENT
(FOR NON-SECURITY RELATED EXPENDITURES)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	172	192	12
REMOTE COMPUTING SERVICES	80	108	35
PROFESSIONAL SERVICES	191	214	6
SOFTWARE PRODUCTS	32	40	25
BATCH SERVICES	75	75	0
EDUCATIONAL SERVICES	11	10	- 9
TOTAL	561	639	14

(\$ MILLIONS)

TABLE VI-2(i)

COMPUTER SERVICES EXPENDITURES ANALYSIS

INDUSTRY: STATE AND LOCAL GOVERNMENT
(FOR LARGEST ORGANIZATIONS ONLY)

COMPUTER SERVICE	1974 ACTUAL	1975 FORECAST	% GROWTH
FACILITIES MANAGEMENT	-	-	-
REMOTE COMPUTING SERVICES	11	14	27
PROFESSIONAL SERVICES	29	28	- 3
SOFTWARE PRODUCTS	6	8	33
BATCH SERVICES	4	8	100
EDUCATIONAL SERVICES	2	1	-50
TOTAL	52	59	13

(\$ MILLIONS)

TABLE VI-2(j)

would reduce the growth rate in remote computing services from 14% to 11%, in facilities management from 14% to 11%, in professional services from 1% to -7%, and in software products from 16% to 14%.

- Transportation has unexpected high growth.

Transportation has a significantly higher growth in its services expenditures in 1975 than in either its total EDP or equipment expenditures. This anomaly is explained primarily by activities in airlines, whose EDP operations dominate those of other industries. Facilities management will increase from a small base for several of the smaller airlines, and possibly also for shipping companies and railroads. Trucking companies will only increase their software products purchases significantly. Remote computing will increase slightly above average, but most of that goes to other airlines such as United Airlines, Eastern and Continental. In summary, then, transportation will retain its previous years' growth rates in computer services expenditures, while other industries cut back.

- Almost no growth in several industry sectors.

At the other end of the growth spectrum, utilities companies will actually reduce their use of computer services this year. These companies are among the first to have direct control on operating expenses established. Their revenue rates are pegged by Public Utilities Commissions, and there has been a 6% or more decrease in the outflow of energy, hence operating revenues have actually decreased in some cases while expenses have been driven up by inflation. In order to protect internal budget items, utilities are paring down external EDP expenditures.

In addition, nuclear power plant construction has been severely curtailed, and some of the need for engineering services consequently will be reduced. Research activity in other power sources will not generate comparable revenues. However, safety and environmental research connected with existing and planned power plants will pick-up much of this reduction.

The telephone industry, which accounts for over half the utilities' purchases of remote computing services in 1974, will reduce its timesharing purchases by shifting some applications in-house and converting others to remote batch at considerable savings.

Consequently, INPUT forecasts a reduction in remote computing and professional services expenditures in utilities in 1975. Since the utility sector was the second largest purchaser of remote computing services in 1974 among these industry sectors, this will have a severe effect on its growth. In addition, the switch in emphasis to remote batch from timesharing will affect the vendor mix.

The discrete manufacturing industry sector will only maintain its 1974 level of computer services expenditures; for professional services there will be severe cut backs resulting, and a reduction of 8% in expenditures as development work is sharply curtailed. The trend towards centralization will provide some consulting and contract work as emphasis is switched from batch to remote batch processing and programming staffs are moved. Actual numbers of EDP personnel may decrease slightly in this sector, and education expenses will be sharply curtailed.

Many companies spent heavily last year to upgrade their equipment and staff capacity. A major part (up to 20%) of this expenditure increase

was to support development activities, often in advanced communications based systems. These activities have been the ones most severely cut. Thus, the internal capacity of existing 'plant' and staff is sufficient, for the moment, to absorb the increased requirements due to expansion of existing and converted communications-based (remote computing) systems.

- Limited growth in other areas.

Most of the growth in the process manufacturing industries' expenditures for computer services will be for remote computing services, which will increase by some \$20 million in 1975; much of this in engineering and data base applications for natural resources companies such as petroleum and mining companies.

The retailing industry is severely affected by the recession and its EDP activities, particularly related to computer services, will suffer accordingly. Since retailers are generally not disposed to use outside services anyway there is a relatively small base activity of \$54 million. These remote computing services, due to credit inquiry services provided by TRW and others, will increase slightly since credit checking becomes even more important in a recessionary period. Batch work will increase slightly to absorb overflow processing, and there will be some initial penetration of facilities management into the large retailers.

B. IN-HOUSE DATA PROCESSING VERSUS COMPUTER SERVICES

INPUT considers that there is no overall trend to the replacement of in-house EDP by computer services. Indeed, the contrary appears to be

true for very large organizations.

- Basic reasons for using computer services.

There are three possible reasons for a user of this size to go outside to a computer services company as opposed to using its own internal operation:

- Cost - it must be cheaper on the outside.
- Time - it can be done faster outside.
- Capability - need a capability not present in-house.

- Cost favors in-house data processing.

The reason employed for going outside for overflow processing is often that it would cost more to upgrade the in-plant equipment on a permanent basis than to meet 'peak' processing needs by supplementing in-house with outside batch, remote batch or timesharing services. One retailer obtaining a 370/158 stated that its use of batch overflow work had increased substantially just prior to delivery of the new equipment; it had now dropped outside work to zero but as requirements built up and the 158 became 'loaded', it would again go outside.

This case is unusual in that most companies of this size have surplus capacity; their plant is designed to handle the processing 'peaks' and more. As stated elsewhere, INPUT considers that the reason installation can add significantly to their communication and terminal base this year, without mainframe and peripheral increases, is that they have surplus capacity now resulting from current development cut-backs and large capacity increases in 1974.

Cost is the most important and frequently discussed item in the survey when considering the use of computer processing services, such as FM and RCS. Some reasons advanced for users to go outside are as follows:

- user of timesharing for sophisticated modelling, 'it saves development \$'.
- user of timesharing in marketing 'equipment is not cost justified internally'.
- another user 'some timesharing used, saving development and cost of equipment'.

However, cost is more often advanced as a reason to bring outside expenditures back in-house, or as the reason services are not used in the first place. This particularly applied to FM. In those few cases outside of federal government where FM had been used or considered by users, the following comments were made:

- 'we considered it in the past; it could not be cost justified'.
- 'were operating under FM until end of 1972; it was not cost effective'.
- 'biggest hindrance possible, very inefficient'.

In remote computing services, cost frequently is cited as the reason for bringing work back in-house. 'We have TSO up internally and we are converting outside timesharing to it; it saves time and money'.

The reason cost is almost always on the side of the in-house operator these days when considering straight timesharing, is that many users use incremental costing methods. They have the EDP facilities basically covered by existing operations so that the cost of adding TSO or CMS becomes

negligible compared with the installed base, and appears to offer an attractive alternative on a financial basis to the outside service.

For the size of company considered in this study, it is unlikely that computer services companies can sell processing, other than limited overflow, on a cost basis. Smaller companies or divisions of decentralized, large companies are more likely targets. One reason for this is that the quantum jump or 'ratchet' effect involved in upgrading equipment to provide for MBO, or a similar timesharing or remote batch capability, will be relatively much more severe in a single 370/145 shop than in a shop with multiple, large scale computers, where such increases are mere perturbations on very large budgets.

- 'Time' is on the side of the in-house department now.

This was probably the major reason for the rapid spread of timesharing in the late 1960s and early 1970s. Users could obtain solutions to their problems much more quickly than through their in-house operations which did not have a timesharing capability. Many of the applications put-up did not, and do not, require interactive, on-line capabilities; they were simply a means to rapidly solve users' problems.

Now, of course, most of the very large companies have capabilities similar to those of the timesharing vendors, and even have internal timesharing staffs to assist users in implementing their applications. Thus, the advantage of the remote computing vendors of being able to react faster than in-house groups is disappearing. These in-house timesharing groups are being set-up in all industry sectors according to the survey; 'we have a system on order for timesharing' was a typical comment from a retailer.

Major, new projects still cause users to look outside:

- 'We often use services at the front end then bring in-house'.
- 'special projects requiring fast start-up are contracted out'.
- 'increased activity will force us to go outside for some support'.
- 'We may have to contract out because of growth'.

These are transient revenues to vendors, although because of the pressures on the user they may be very profitable while they last.

- Capability provides some opportunity.

Overall, this is now the major reason for very large organizations to go outside for computer processing services. Given sufficient time or money, of course, almost any capability can be transferred in-house, so that 'capability' as a reason is always combined with 'time' and/or 'cost'.

In facilities management, the particular capability of EDS in the Medicare/Medicaid processing field combined with the time constraints imposed on states and insurance companies to start operating the programs, was the reason for its explosive growth. In banking, Bradford has leveraged its trust accounting capability into contracts with several major banks.

A bank respondent to this survey stated that it had signed a FM contract with SEI in Pennsylvania to provide personal trust accounting services. The bank had spent considerable time and money to develop a package and had not been successful, although they had succeeded with a corporate trust system. After a nationwide search, the bank found the capability it needed at SEI.

For the size of organization considered by INPUT here, it is difficult to identify standard computer capabilities which their data processing

departments do not have. However, the very size of these organizations means that there are multitudes of needs which cannot all be satisfied by internal capabilities. For example, several airlines and manufacturing companies surveyed, reported use of APL services from Proprietary Computer Systems or The Computer Company (APL subsidiary). A large manufacturer was using a specialized graphics capability from a vendor.

As long as this usage remains at a level where it does not look attractive, from a cost viewpoint, for the user to develop the capability in-house, these expenditures will continue. When the cost of implementing the in-house capability comes down, and the use of the outside service goes up, there is a 'cross-over' point reached at which almost invariably the work is converted inside. This classic point has been reached and passed with interactive program development; several users in the survey mentioned converting from National CSS and IDC to in-house TSO or CMS for this purpose. Since these were large contracts (\$500,000 per year in one case) these losses were significant to these companies, even though they have been aware for some time that this would happen; they could see the 'cross-over' point coming.

The major capabilities which are generally not replaceable by the in-house data processing department, are those related to data bases, sophisticated models, and complex software. In the last category, structural engineering applications for use in power plant design, offshore oil rig construction and major construction projects, were identified in the survey from companies such as CDC, McAuto, Boeing Computer Services, and General Electric. These typically require large, 'number-crunching'

machines such as CDC Cyber series, Univac 1108 and 1110, and IBM 195s.

Data bases and sophisticated models, particularly in the financial area, were being used by companies in all industry sectors, but particularly in banking and manufacturing.

- Decentralization provides opportunities, but is against the trend.

From the survey, it is obvious that as a very large company centralizes and consolidates its EDP, the opportunities for computer processing services companies become more limited. One utility had embarked on a consolidation program some time ago; timesharing was to be the last area looked at. The company found that there was use of \$500,000 of timesharing from GE spread throughout operations, administration, engineering and marketing areas. In addition, there was major remote batch activity in nuclear power plant design with several vendors. The outcome of the investigation will be the replacement of 90% of the GE timesharing by installing a large-scale Honeywell computer.

Another company still operating in a decentralized mode, reported that it had a central facility which could provide services to subsidiaries. However, subsidiaries were free to choose the central facility or an independent vendor. Since the central facility operated as a full charge-out operation, it could not benefit from incremental pricing in competing for such contracts any more than could independents.

Several respondents from companies operating in decentralized mode, for corporate operations as well as data processing, made statements such as, 'some companies have their own systems while others use timesharing'. This indicates that computer processing services companies still have

major opportunities in conglomerates and others operating in this mode.

There are also other major opportunities to assist those companies which want to centralize their operations. This is a major identifiable trend from the survey: an airline consolidated 4 centers into 1, an oil company is consolidating centers from Houston and Atlanta, a manufacturing company plans to consolidate 27 centers, a process manufacturer is consolidating two centers into one IBM center and is using McAuto to provide IMS and TSO support to enable it to do so, and so on.

• Other factors relating to the contest.

Of the responses to the questions on considering the use of FM or a 'computer utility' (a term which was not recognized positively) only three could be considered at all positive:

- 'looked at it to determine feasibility'.
- 'have group continually studying feasibility'.
- 'philosophy of investing in analysts and programmers, and leaving the data operations to timesharing operators, avoids the headaches of a production shop'.

Many others were extremely negative, ranging from 'absolutely not' to 'not at all, we are far too sophisticated'.

Only two of the almost 120 respondents identified security as a consideration:

- 'prefer own system, security sometimes a problem'.
- 'installed TSO and converted timesharing in-house; cheaper and stops data bases being moved outside'.

It still may have been a significant factor for many of those who

just said 'no'. However, cost was mentioned fairly frequently in the same context, so that it would appear security is far less important still as a consideration.

- In-house EDP and processing services can complement each other.

For the size of organization represented in the survey, the trend is primarily to in-house processing. Remote computing vendors and FM vendors will not replace in-house processing except in rare cases. These cases will be based on unique vendor capabilities such as the trust accounting services provided by Bradford.

In-house processing will replace outside vendors for standard applications and services in these companies. However, remote computing companies will continue to expand revenues by penetrating new user areas. They will also continue to expand revenues from unique capabilities such as network capabilities, data bases, financial models, special software (such as APL), and graphics support.

Remote computing and FM vendors will benefit from rapidly implemented new programs, particularly in the federal government. But there will also be opportunities in the business and industrial area for similar services: for example, the increased emphasis on oil exploration caused rapid expansion of computer services expenditures for oil rig construction and operation.

Finally, the areas in which outside vendors will most easily be able to replace in-house processing or avoid severe competition from the EDP department, will be in specialized, secondary processing areas such as trust accounting in banks and insurance claim processing for manufacturers, where the cost of developing the in-house capacity is not warranted.

- No impact of minicomputers on computer services reported.

Not one respondent identified an impact of minicomputers on remote computing services. The contrast was between in-house EDP on large machines and RCS. There may have been some replacement in the 'field', where both timesharing and mini purchases are under the control of local managers. In any event, it was not thought worth identifying it, if it was occurring and was known to the EDP managers and financial officers interviewed.

C. COMPUTER SERVICES CATEGORY ANALYSIS

1. Facilities Management

The facilities management market addressed in this report covers all of the non-security related federal government ADP, but excludes the approximately \$200 million of expenditures for FM in the Medicaid/Medicare area. The reason for this is that there is federal and state money involved, and yet the operation is through an insurance company or by contract to a state agency. Thus, there is no one appropriate industry sector in which to categorize these expenditures. In the case of Medicaid programs operated by the state, EDP expenditures are counted as for any other program. Also, the vendors involved in this market include insurance firms such as Prudential and Equitable as well as EDS which has about \$70 million in annual revenues from its contracts.

- The market is recession proof.

Because of the nature of the long term contract involved, the facilities management market specified here is virtually recession proof. In fact, deepening recession might have a positive impact as companies turn

over some of their internal timesharing to vendors to manage, particularly if development cuts further reduce capacity requirements.

Also the federal government component is 60% of the market in 1975, and the trend in a deepening recession will be for an increase in the use of FM by the government. The federal government with the other 'recession proof' industries of insurance and banking, account for 80% of this market.

At this size, companies are likely to be vendors not major users.

Of the organizations contacted only one, outside banks and the federal government, used FM at all, and that was a manufacturing company's subsidiary which had the contract before it was acquired. However, insurance companies, banks, a retailer, and an airline all marketed it.

Industries use FM in secondary areas.

In the insurance and diversified financial industry sector, usage is primarily for health insurance, where Blue Cross/Blue Shield and others contract with organizations such as EDS for FM of their standard programs. (Medicaid, Medicare, and CHAMPUS programs are not included). There is no financial FM market; as one respondent put it 'EDS gave FM a bad name on Wall Street'.

Secondary applications areas such as trust department portfolio management and timesharing, are the contributors to FM in the banking area. This will grow rapidly (35%) this year as more banks turn their trust department activities over to vendors such as Bradford. Also, smaller banks on the list which have severe systems problems may contract out their in-house EDP in order to get the capabilities necessary for them to compete. An example of this is EDS' contract with the Bank of California.

In the retail industry, FM will make an initial penetration this year into the large department stores. This could be through TRW or EDS, which has a contract with a subsidiary of Federated Department Stores.

Growth in discrete and process manufacturing will be primarily from cost escalation clauses and increased processing in existing contracts. Also some subsidiaries of major companies will contract for FM to obtain improved systems capability, particularly of an on-line nature.

In transportation, shipping companies and airlines will provide a rapid increase on a small base of \$10 million. With airlines, the contracts will be with larger airlines such as UAL, Eastern and Continental.

In the federal government, the survey identified several agencies that contracted for special projects or field operations. In addition two new contracts were specifically mentioned. INPUT considers that the 12% growth rate applied to FM in this industry sector is conservative. Given new energy and social services legislation, the market could increase to over \$200 million this year. Two agencies stated that their EDP budgets could double if pending legislation was passed. CSC, SDC, PRC, OSI, PMI, and the aerospace spinoffs will benefit significantly from these activities.

There is little or no FM activity in the major states and cities.

2. Remote Computing Services

Remote computing services consist of three types of service, time-sharing, remote batch and data base inquiry, such as stock quotation and credit inquiry systems.

- Deepening recession will have mixed effect.

Any deepening of the recession would cause further decreases in the use of timesharing in most industries. Data base inquiry would probably also be cut as a result of corporate restrictions on outside expenditures and drop-off in use of stock quotation systems. This assumes that the activity level in the stock market would decrease with the recession.

Remote batch on the other hand will probably benefit in a number of ways. Firstly, more timesharing applications will be converted to remote batch to save cost: users will trade a level of service which is often not necessary for cost reduction. Secondly, it will be looked at as an alternative for in-house processing capability by companies that decide to drop equipment or not acquire new equipment even though they have capacity restrictions. Also a large part of new federal programs will be transaction oriented and require remote batch processing.

Overall a deepening recession will reduce growth to a few percent, but because of the factors mentioned above, it will not suffer an overall decline unless a very severe recession develops.

- Trend to remote batch.

There is an identifiable trend to remote batch which is represented by such statements as:

- 'RJE and remote batch use increasing at several locations'.
- 'using \$1 million of timesharing from 20 vendors; RJE will replace almost all of it'.
- 'large remote batch won't be touched'.
- 'in addition, timesharing jobs being converted to remote job entry'.

This trend is caused by a number of factors:

- Terminal technology and pricing have made it possible to have a remote batch terminal for several hundred dollars a month, for example Hazeltine, Sycor and Datapoint, compared to a thousand dollars a month for IBM 2780, 3780 and Data 100 types of units. This has opened the way for a whole set of applications to be transferred from timesharing or developed from scratch.

- Data communications costs and increasing use have made users look closely at ways of saving money. One of the ways is to replace open interactive connection by polled or remote batch configurations. Several respondents confirmed they were doing this in-house, particularly a bank which was reducing its line charges by 80% in this manner. The same approach applies to use of remote computing services.

- Finally much of the applications specialized processing involves large numbers of transactions or large and lengthy processing capability, such as linear programs for oil industry distribution systems. This type of remote computing processing which has a significant growth rate is performed in remote batch mode.

A countervailing force to this remote batch growth is the desire of many users to get rid of paper products and supplies. Thus, data entry is being pushed back to the originator via CRTs and this equipment is also being used for data retrieval and inquiry as opposed to voluminous reports. Much of this is done in an on-line or timesharing mode, although the use of clustered CRTs and intelligent terminals will cause an increasing amount to be through remote batch.

. IBM operating system developments bring remote computing back in-house.

Of the respondents to the survey, 16 major users of remote computing services announced intentions to reduce it, or actual reductions, by bringing it in-house. For some large users this would require the acquisition of a large computer:

- 'using \$500,000 per year of CDC Cybernet for engineering; will replace with CDC Cyber computer in-house'.
- 'installing Honeywell 6000 which will replace 90% of \$500,000 per year of GE timesharing by June 1975'.
- 'telephone companies stopping growth of timesharing; using MP on IBM, DEC 10s, Honeywell and possibly CDC'.
- 'timesharing will increase 10% this year from \$1.8 million; getting 370/168 under TSO to replace \$1.2 million worth'.
- 'replacing Infonet contract by getting Univac 1108'.
- 'bringing in-house; new 370/158'.

However, most of them would simply upgrade their existing systems and use new software:

- 'TSO in-house will reduce outside use'.
- 'replaced \$500,000 IDC contract with TSO in-house. Disaster at first but now satisfactory'.
- 'previous very large user of NCSS for program development; now use in-house 370/158 under CMS'.
- 'TSO has been introduced and cost comparing with outside; appears TSO more economical so will reduce outside'.
- 'used timesharing until 1975 but the cost was high and VS allows it to be brought in-house.

Thus TSO is the main vehicle being used by users to bring timesharing in-house. This must hurt those vendors such as NCSS and IDC which have concentrated on providing IBM based timesharing services. Fortunately, both these companies have tried to emphasize package and data base specialized services in the past few years. Nevertheless, the large contracts they have lost were significant contributors to revenues and profits.

Although some respondents reported reducing timesharing to zero or close to it, most of them expected to reduce its use rather than replace it completely. In those users with timesharing and remote batch vendors, often timesharing was the main target of the reduction. This was because the remote batch activity was heavily package dependent. Hence remote computing services in these companies will generally decline rather than stop abruptly. Further, if vendors can identify and increase application use faster than the EDP department can convert, it will still go up.

One of the steps to bringing outside remote computing back in-house, is the consolidation and centralization of the outside activity. Typically a study is started to collect information on what is being done and how much is being spent with which vendors. There is then a consolidation of vendors, just as one government agency reported reducing 27 vendors to 3. The target is then more easily defined, and the in-house group will move to replace all or the major part of the expenditures.

- Financial modelling and data base usage is increasing the fastest across industry sectors.

In the insurance and diversified financial industry sectors, the main use is of stock quotation systems from GTE, Bunker-Ramo and Quotron.

However, these are purchased outside the EDP department and were not mentioned by respondents in the survey. Apart from this, there was increased use for data base and financial planning. One user with TSO up internally was still doing program development outside.

One of the largest banks reported subscribing to 13 remote computing services companies for applications over almost all functions; overall increases were expected to be over 20%. It also had a vendor running an internal timesharing 'shop'. Another bank had \$300,000 of annual expenditures to NCSS and internal timesharing operating at the equivalent of \$1.2 million per year; it had replaced a \$500,000 per year IDC contract. Several banks identified the use of RCS for portfolio accounting, bond activity, financial modelling, and data base access. Most reported moderate increases but one was as high as 50%.

Relailing was a very small user of RCS except for credit inquiry services, purchased outside the EDP department from National Data, TRW and others. However, internal timesharing is increasing with several vendors stating they had computers especially for that purpose, including Honeywell and Hewlett-Packard. One large chain was using about \$500,000 per year, but was going to reduce it to less than \$100,000 a year through TSO. The remainder would be for graphics use and a small amount of remote batch.

In discrete manufacturing companies, there was a move to replace outside services with internal processors. One user had replaced GE with H-P computers, while another was looking at replacing Cybernet services with an in-house CDC computer, as mentioned previously. Growth in this industry sector is severely held back by the problems of the automotive industry which is a large user of RCS.

Process manufacturing RCS activity was widespread and growing relatively rapidly. Of 14 respondents 4 planned to reduce usage through moving it in-house. There were a wide variety of vendors mentioned for different applications including:

Tymshare - piggyback corporate planning model from On Line Decisions.

IDC for data base work with a mining company; also doing tax model and opportunity planning; using virtual port to keep costs down.

National CSS - huge environmental data base being built up. Also individual mines moving to timesharing.

Bonner and Moore, UCC, Rapidata, and GE being used by chemical group for linear programming and other activities.

GE - corporate financial consolidation for an oil company.

Rapidata - used for financial investment analysis.

CDC - used for technical computing

McAuto - main vendor of 20 used including NCSS, BCS and IDC because of IMS and TSO capability. Helping user to implement systems to reduce outside purchases.

One of the two companies in the survey to report considering, or using, RCS to fulfill data communications needs was a decentralized process manufacturer. Some of its constituent companies used timesharing, others internal computers.

The trucking companies surveyed did not use any form of RCS. A little use was found in railroads and shipping lines but not enough to be significant. This sector is then dominated by the airlines, several of whom sell services to other carriers.

Two airlines were using APL services in small amounts, the only companies to report so doing. Customer handling, marketing and sales, accounting, and operations were all areas using RCS in both companies.

The telephone companies in the utilities sector account for about 60% of the total sector expenditure for RCS. Their use of RCS is forecast to grow at a 12% rate this year, down from previous years. This slowing down will accelerate in the next few years as users bring services in-house through new and upgraded equipment. There is no trend identified to the 'facilities management' of internal timesharing as performed by Rapidata and Remote Computing Corp.

Several of the electricity and gas utilities were major users of RCS, one spending \$1.8 million and another over \$1 million annually. All three of the largest users were converting or had converted in-house, using different methods: one had used VS to replace the outside work, another was bringing up TSO, and the third was implementing an in-house Honeywell computer.

Timesharing itself was being used in the large users for a variety of applications throughout the organizations, many of which do not need an on-line capability. Applications included employee lists, budgeting and production systems, as well as engineering systems.

The most frequently mentioned use of RCS was remote batch for engineering applications, although the dollar volume of purchase was much smaller than the large, general timesharing purchases. One large user of McAuto, CDC and USS Engineers for structural engineering and nuclear program applications, was considering trying at least one major package and bringing up the operation in-house. In another company UCS and CDC were used for engineering

applications as well as GE. Five other utilities mentioned a small or occasional use of RCS for plant design and other engineering applications.

The federal government could emerge from the next two years as by the far the largest user of RCS. However, this is dependent on the extent to which the current Infonet contract is brought back in to GSA. INPUT projects that this contract, which will be worth close to \$35 million in revenues to CSC in 1975, will remain in force over 1975 and 1976, although the contract may be broken into segments or change vendors in this period.

The new agencies and those with new programs project a large increase for RCS: one agency has a \$6 million budget for next year compared to \$1.1 million in fiscal 1975. One huge user expects a 20% increase; the actual work load will increase even more, but in-house capability will absorb some of the expansion.

The reason for the growth of Infonet from zero in 1971 to well over \$30 million in fiscal 1975, is that GSA has actively and aggressively marketed it with CSC to agencies. The restrictions applied by GSA to other agencies' use of timesharing contribute a small amount to this growth primarily by picking up small agencies; large agencies find it relatively easy to use the vendor of their choice. One agency reported using 27 vendors last year, although it has since reduced this number to 3.

Two agencies getting new computers are reducing their RCS expenditures as are some agencies whose programs are being curtailed.

In state and local government, very little use of RCS was identified. Actual use is somewhat higher due to a number of agencies using timesharing in the planning and budgeting area. This is virtually an untapped area for

RCS, but is held back by lack of capability in the users' departments. Changes of administration such as have just occurred in several key states will cause the use to increase slightly this year.

3. Professional Services

This section covers those expenditures to outside vendors by large users for EDP consulting, network communications design, programming, EDP planning and evaluation, systems performance improvement, etc., where the user is effectively purchasing the skills of EDP people. Personnel services, including agency fees, are counted in the personnel budget category. Purchases of SE services from mainframe vendors such as IBM are counted in the professional services category.

• Vulnerability to a deepening recession.

There will be only a very small growth (1%) in 1975 for professional services since the majority of them are purchased for development activities, and this has been the area most severely hit of all EDP expenditure categories, with the possible exception of education services. Since labor costs have increased significantly, even without large salary increases, there will be actually less work performed in 1975 than 1974 by about 5%.

A further deepening in the recession will force even more cutbacks in development and cancellation of professional services contracts. The impact will be felt even more on professional services because of in-house managers' desires to protect their staff as long as possible.

One factor bearing on this is that very few professional services

companies contacted in a recent INPUT survey were planning to up their billing rates in the first quarter of 1975. Many companies had put up their rates last year, but have waited to see what will happen this year before changing them. Of course, quoted rates are not those charged since almost all vendors bid on a project basis, and adjust their rates somewhat. Because of the possibility of wage/price controls, few vendors will announce price cuts.

3. Industry variation in use.

In the insurance and diversified finance sector, most users replied that there would be no change in its use or that none was used. One user reported a decrease of 40% because of heavy use in 1974, which will now be reduced as people are hired.

Banking is the fastest growing industry sector in the use of professional services at 18% due to some continuation of development efforts, particularly related to funds transfer activities, performance evaluation, and communications systems design.

Little use of professional services is made in retail, although there is some for the design and installation of data communication based systems. What there is, is primarily for CPAs and management consulting companies such as Booz Allen and Cresap.

Manufacturing industries will both decrease their use of RCS as development activities are sharply curtailed. The only respondent with major growth (25%) was in the middle of a \$1 million development project with Arthur Andersen, which it would be difficult to cancel now.

In transportation the only increase in use reported was where a user

had bought a hardware monitor and was using professional services to work with it. This is one area of consulting which will increase in 1975, that of performance measurement and evaluation.

There was a slight increase reported by two utilities of professional services use. However, this will be dominated by the decrease much larger users were planning.

The federal government will be the industry sector with the major dollar volume growth, although its rate of growth will be second to banking. The reason for the growth is that there is a hiring 'freeze' in the agencies which forces them to go outside when their requirements increase, usually because of legislative or administrative laws or rules.

Although state and local government agencies report 'no change' or decrease, the demands on these agencies will force them to contract out for support, particularly in the health and welfare field. Also the recent change of administration in many states ensures that some contracting will be done for professional services through the Governor's office.

4. Software Products

Software products consist of two categories:

- Systems packages including functional software such as operating systems, compilers, utility packages and sorts.
- Applications packages which may be for a specific industry or be cross industry in nature.

- Vulnerability to deepening recession.

Systems software has effectively the same vulnerability to deepening

recession as mainframe equipment. The only difference would be that software obtained purely to facilitate development could be discontinued more easily: TSO would fall into this category in some cases. However, since its purpose is to make the program development function more efficient, existing installations would probably retain it. Those installations planning conversions to it, would delay the process because it is expensive and time consuming.

In general software conversions are being slowed down now, except in those cases where the conversions involve consolidation. A deepening recession would, on the one hand, accelerate consolidation including software conversions and, on the other, stop software conversion in existing installations. The net result would be a slowing of systems product expenditures.

Applications packages will initially experience a slowdown, but if the level of recession continues, or deepens, then the market will pick-up again. Users will turn to products to satisfy the ultimate user needs for which they would normally use their in-house staffs. If the recession does continue, the user will be more and more willing to trade custom features for cheaper, standard software.

An application that will grow significantly this year is that of performance measuring and system simulation. Users will be looking closely at their systems to determine where they can make economies.

In a deepening recession therefore total user expenditures for software products would still grow but at a minimal rate compared to the current growth rate of 16%

- Packages' growth picks up the slack between personnel and equipment.

As shown in Table VI-3, in those industries where equipment grows in 1975 at a lesser rate than personnel, software packages grow at a relatively low rate. Such industries are retail and utilities.

Industries where equipment grows significantly faster than personnel have a much higher growth rate for software products; these are federal government, state and local government and process manufacturing.

For the remaining industries, software packages' growth varies somewhat, but is generally slightly higher than the equipment growth. This is due to systems packages growing at an equivalent rate to equipment, and applications packages taking up the slack when systems and programming staff do not grow as rapidly.

In the insurance and diversified financial industry, several companies made large purchases in 1974, so that reductions of 40 - 50% in this category were given. On the other hand, other users will increase purchases this year including one that plans 100% increase. Purchases for systems packages included IBM's TSO, and Informatics' Mark IV. In the applications packages area, payrolls were purchased from MSA and PHI, and insurance software was sold by Equimatics.

Applications packages purchases by several large banks will be lower in 1975 than 1974 because of large purchases in 1974. Particular areas mentioned were stock transfer and general transfer. Other banks indicate fairly small growth at best, from 0 to 20%. Consequently, growth will be in the systems area and will parallel that of equipment.

Retailers have purchased systems packages in a small way in the past;

SOFTWARE PRODUCTS GROWTH RATES BY INDUSTRY

INDUSTRY SECTOR	% GROWTH 1975		
	PERSONNEL	EQUIPMENT	SOFTWARE PRODUCTS
INS. & DIV. FINANCIAL	9	9	12
BANKING	7	8	10
RETAIL	3	2	0
DISCRETE MNFG.	5	5	11
PROCESS MNFG.	7	9	28
TRANSPORTATION	2	2	21
UTILITIES	5	4	7
FEDERAL GOVT.	7	10	25
STATE & LOCAL GOVT.	4	6	33

TABLE VI-3

EDOS, Panvalet, and Mark IV were mentioned. Not one indicated any possible growth in expenditures this year.

In discrete manufacturing there is minimal growth indicated other than for systems software. However, INPUT projects that performance measurement and secondary applications packages purchases will hold the growth rate up above that of equipment, but still far down from previous years' growth rates.

There was a definite indication of increased software packages acquisitions in process manufacturing in 1975, mainly in the systems area. Packages that were being acquired or considered included information retrieval languages (Mark IV and RAMIS), linear programming (LP360), librarians (Librarian) and computer operations scheduling and simulation models (Deadline from Tesdata). In the applications area, there was much less activity; again payroll personnel packages were being purchased - a rather strange phenomenon considering the size of these companies and their length of use of computers.

In transportation there was a small amount of growth indicated by the survey, about 5%. INPUT has adjusted this growth upward to take account of major applications packages sales to airlines and also some to trucking companies.

Utilities will have minimal software product growth, primarily in systems software. Some package purchases will allow conversion of timesharing applications to in-house operation.

Almost 80% of federal government agencies interviewed expected increased purchases of software products. This would attempt to fill the gap between the demands of the agencies' programs and their capabilities to meet them,

bearing in mind personnel restrictions.

All but one state and local government agency planned increased expenditures for software products this year. Prime acquisitions would be systems packages, including IBM program products.

5. Batch Services

Expenditures by users for batch services include those for data entry, IBM and computer time.

The bulk of user expenditures for batch services is by smaller companies than those covered in this report. Even so, the size of the batch services market for very large companies is bigger than facilities management in several industry sectors.

The main components of this \$185 million market in 1974 are as follows:

- Large scale structural analysis, linear and dynamic programming, modelling, and networking applications run on large CDC, Univac and IBM computers. These applications are used by large engineering departments working on major projects in manufacturing companies and utilities. Much of this work can, and is, done in remote batch as well.

- Overflow processing when the users' in-house capabilities are unable to meet demand. This will grow this year particularly in state and local government agencies, as health and welfare departments require data entry and processing support. There will also be some in discrete manufacturing due to in-house restrictions on growth.

- Processing of standard applications, such as payroll and accounting, for subsidiaries or plants at remote locations without access to the central

EDP facility. This decreasing with the spread of distributed processing.

- COM work is a major contributor to growth in insurance and diversified financial, banking, and retail industries.

The federal government data entry market, which approaches \$30 million per year, is gradually being replaced by distributed processing. However, this is a slow trend and the drop is being more than made up this year by the increase in the use of COM.

6. Education Services

Although this was not covered in the survey questions, INPUT has determined that the most damaging effect of the recession on computer services will be on education services. Seminar attendance in particular will be cut back. However, users will still buy in-house training courses when they expand their capabilities. Personnel growth will be static, so that the use of in-house training courses, while increasing, will not offset declines in the use of schools and seminars.

State and local government, which is parsimonious anyway, will cut its expenditures for education services to close to 0. Process manufacturing will be the only industry sector with any growth (9%); this is due to their continuing systems upgrade and the need for education to support new personnel.

VII STRATEGIES AND OPPORTUNITIES

This section identifies key market areas protected from recession and discusses strategies and opportunities for penetration of computer services and equipment markets in 1975 and 1976. Recommendations for market positioning to take advantage of the forthcoming recovery are presented together with some competitive impacts in these markets.

A. KEY INDUSTRY MARKETS PROTECTED FROM RECESSION

There are several industry sectors which are protected to a certain extent from the effect of the recession. The main ones identified in this study are:

- Federal Government, particularly those agencies whose programs are directly involved in dealing with the causes and affects of the recession. These include HEW, DOL, HUD, FEA, and EDP. Also the Department of Defense will continue to be a growing market for computer equipment and services.

- Insurance industry, especially life insurance, will benefit from this recession in some ways. Massive expenditures for distributed processing systems will continue.

- Natural resources companies, particularly those involved in the production of energy will have rapidly growing computer needs to support exploration, research, development, and operations. Minicomputers and remote computing services will benefit from this expansion.

- Banks are protected to a more limited extent than the previous industry sectors. They could suffer from drastic squeezes in operating expenses as their interest income decreases.

Other market areas, such as health and social services in state and local government, are protected against serious decreases, but it is questionable whether they will have funds available for major in-house expansion in this period.

Further, EDP departments in the very largest companies in each industry sector are better protected against the recession than the others according to this survey. This could be because they feel the impacts later or because their massive size enables them to take maximum advantage from any given situation. This certainly appears to be true in the banking, insurance, and utilities industry sectors.

B. STRATEGIES FOR MARKET PENETRATION

The equipments' markets with growth rates greater than 10% are:

- Secondary processors in insurance, banking, and process manufacturing.
- Peripherals in insurance and federal government.
- Terminals and data communication equipment in insurance, banking, manufacturing, and federal government.

These must be the key equipment markets to pursue.

- Cost/performance emphasis is the main strategy.

Users are more interested in performance per dollar than features. Moreover, they will only buy the minimum features and performance that they need. Only in certain circumstances such as preparing for distributed processing networks will users purchase more capacity than they need.

INPUT recommends that equipment vendors offer stripped down versions of their equipment, without unnecessary but 'nice' features, at considerable price reductions. Particularly in the peripherals and terminals area price reductions will be effective, not only in obtaining increased shares of new markets, but in replacement selling, which is what most sales people will be doing this year.

- Emphasize moving costs outside EDP departments.

One reason that EDP departments are emphasizing remote computing and distributed processing, is that it moves much of the data entry, control, and information handling functions back to end user departments. This then shows up in reduced operating costs for these functions, allowing other activities to expand a little more. Vendors of communications related products should emphasize this feature.

Ideally, cost should be displaced outside the company. Products such as double density disc drives will receive major acceptance not only because of improved price performance, (when contention problems can be avoided), but also, according to INPUT's respondents, because they reduce supplies (disc pack) and personnel needs.

- Services companies must sell cost replacement to the end user.

Basically, services companies are going to compete even more seriously with in-house departments this year than in the recent past for the end users' dollars. The main advantage that vendors have is the capability to sell end users on cost replacement systems. This requires user industry operations knowledge. This can often be best obtained by timesharing and other processing companies from small, specialized, professional services companies. Since both these groups will be severely affected in their normal, separated markets, they should combine forces to find ways of servicing end users in selected industry areas.

In this case, one strategy is to select those industries such as utilities, transportation and retail, most severely affected by the recession. Cost replacement will be more rapidly accepted there than in the recession proof industries.

- Professional services companies must find alternative markets.

Companies involved in providing professional services to user departments must emphasize cost reduction by use of their services. There will be a market for services which will enable users to determine how to reduce hardware, software, and communications costs, yet retain their performance capacity.

Also, professional services companies that can afford the investment, should convert some slack capability to producing cost effective applications products, preferably for secondary applications, which will receive a ready market in those companies that are concentrating on developing prime systems, but have a secondary systems need. For example, the

survey identified two huge companies that recently bought payroll packages, of all things, for corporate staff payroll.

Another set of products that will receive massive attention are those which enable systems and programs to be more effectively and economically developed. Several users identified this as an area they would consider. TSO is being implemented by many users with this in mind.

- Remote computing services should emphasize remote batch/interactive interface.

Remote computing services companies must emphasize the differences in their capabilities from in-house groups to avoid losing business. Services in the survey results which stood out as being relatively safe, were graphics processing, APL services, network dependent applications, and large-scale, remote batch purchases, which were dependent on specialized software and 'number-crunching' capability.

In those areas where it is not possible to differentiate the current services, the vendor must rationalize the users' processing to put it in the most economical form. If an application can be handled more cheaply, for the user, in remote batch than in timesharing mode then the vendor must sometimes take the initiative in converting. Otherwise it risks losing it all.

C. OPPORTUNITIES

- Opportunities in users with major operating problems.

There will be some scope for facilities management and remote computer

services in those situations where in-house departments are stretched beyond their capacity. However, the vendor must be able to show significant cost justification to corporate management.

The strategy is to emphasize that the only way the user can effectively get the necessary systems to compete in its market, is by buying an established capability. This will most often be successful in secondary operations, such as the trust department of a bank, as happened to one bank in the survey, or in subsidiaries of major corporations which are not in the mainstream of its activity.

- Assisting in consolidation is a major opportunity.

Because of users' tendency to emphasize consolidation, any vendor of equipment or services which can significantly assist in the centralization of a user's operations has a major business opportunity. McAuto has successfully demonstrated this tactic by becoming the major vendor to a process manufacturer that wishes to consolidate onto an IMS-based system. McAuto's assistance is enabling this to happen and the keys to their achieving significant revenues were their capability in IMS and their willingness to work with the user to move the work in-house eventually. However, if the user chooses not to expand its configuration, the work will stay with McAuto.

- Turnkey systems fit into distributed processing.

In those industries such as insurance and banking, which are tending to distributed processing networks, there are major opportunities for installing applications-specialized, turnkey systems. In banks, these

include banking and non-banking activities, such as corporate and personal trust accounting, credit card handling, and money transfer.

The vendor should emphasize compatibility of the system with the operating and communications systems run on the user's main processors. This is where IBM System/32s will be most competitive and result in their obtaining a large proportion of such sales.

In insurance Nixdorf and Olivetti have demonstrated the success of this strategy by installing turnkey systems for policy and claims control in local offices.

- Overflow processing will have a major growth.

More and more in-house users will emulate the user who stated that he planned to use outside services for overflow towards the end of the year, when his existing equipment becomes full. These users will use remote batch in the future where previously they would only have used batch.

In order to take advantage of this, vendors must be able to offer standard mainframe manufacturer's software. Revenues from this will be transient but they will be welcome this year.

Health and welfare agencies in state, local, and federal government will be major opportunities for this type of service, since they are going to have continuing severe problems of capacity.

- New government legislation and regulations will provide various opportunities.

Major vendors must emphasize government marketing this year. This

is not only to take advantage of the major markets that exist or will be created there, but also because the impact of proposed legislation in the health, environment, and privacy areas will radically affect commercial and industrial markets.

The trend of the federal government to facilities management also provides major opportunities. It could be stopped by Congress, but this is unlikely. This trend will gradually move into state and local government over the next several years.

D. MARKET POSITIONS FOR THE RECOVERY

The following are INPUT's recommendations for vendor positioning for market recovery:

- Distributed processing means decentralized decision making.

Equipment vendors must plan to market in future more like services companies do now. With distributed processing systems, end users will have a far greater say in equipment selection than they do now.

- Equipment will be industry/application specialized.

Systems to be sold to users will increasingly be end user specialized in order to obtain price/performance advantages and make the equipment simpler to use. This trend will favor large manufacturers, who can cover a range of industries. However, small industry-specialized firms will be able to penetrate competitive equipment markets, provided they can show a sufficient level of service. Incoterm's success in airlines demonstrates this.

- Users need help with the central system.

Vendors will improve their chances significantly by developing methods to assist users in simplifying their planning and operations. This could include providing users with models for their use in evaluating their needs in equipment, software and communications. Also, simplified operating systems would be a significant advantage.

Also, the complexity of the operating systems is slowing the growth of EDP as more of the users resources are being applied to keeping pace with data base/data communications, operating, timesharing, and retrieval systems. As shown in the survey, when restrictions are imposed the user simply stops upgrading unless compelling cost/performance reasons are present.

- Products must have 'compatibility power'.

Products must be designed so that they can interface with other manufacturers' products with minimal effort. Preferably they should be able to be made compatible by simply changing software or microcode.

Part of the 'compatibility power' should involve the ability for the equipment to be tested and its control programs maintained through a network interface. This will be particularly important with major distributed processing systems using hundreds or thousands of component units.

- User maintainability must be possible.

The structure of the IBM System32 is such that it could almost be maintained by the user, with the exception of mechanical failures. If the user was provided with spare circuit cards (microprocessors and memory),

it could substitute one in the event of failure or could put in modifications sent through the mail.

With the proliferation of end users expected in distributed processing and data communications network developments, maintenance becomes a significant problem, and methods of saving maintenance costs and hence customer charges will produce major competitive advantages.

E. IMPACT ON COMPETITION

Impacts of the study findings on various vendor groups are described below:

- IBM initially benefits from consolidation.

There is no doubt that IBM is the main beneficiary during the actual consolidation process. However, it needs to add processing capability to the higher end of the 370 range, to provide the performance that the consolidated centers require without their having to add another computer. Users will consider alternative computers for special functions in the center such as timesharing or scientific and engineering processing, but the main computers invariably are IBM.

- Some cracks after consolidation.

As users move out through distributed processing systems, they appear to be more receptive to alternative mainframes as long as they can interface with the hosts. This is the major opportunity area in these companies for smaller mainframe suppliers.

- PCM will benefit in 1975 and 1976.

There will be further equipment substitution during 1975 and 1976, particularly in industries such as insurance, trucking, state government, and retailing, where users have tended to stay with one vendor. Memory extension, tape drives and disc drives are prime candidates.

In terminals, CRTs will obtain rapid growth for data entry as well as for remote applications use. IBM will often be the initial supplier, but will frequently be replaced as the main supplier.

- Suppliers to protected industries should benefit.

Those vendors whose major markets are federal government, insurance, and banking, should be protected against major market shrinkage. Vendors of process control equipment to process manufacturing companies will have significant revenue increases, as will suppliers of remote computing services to this sector.

- Shrinkage of the generalized, timesharing market.

Movement of outside purchases onto in-house equipment will seriously affect the non-application or data base specialized services of timesharing companies. In addition, remote batch vendors will be aggressively attacking this portion of the market, so that straight timesharing companies will be squeezed between new vendor competition and increased in-house activity.

Honeywell and DEC will benefit from the trend to moving timesharing in-house; IBM will also expand many user systems as a result.

Timesharing companies must then look for growth markets in other areas and with other specialized services.

